

## North Lahontan Hydrologic Region

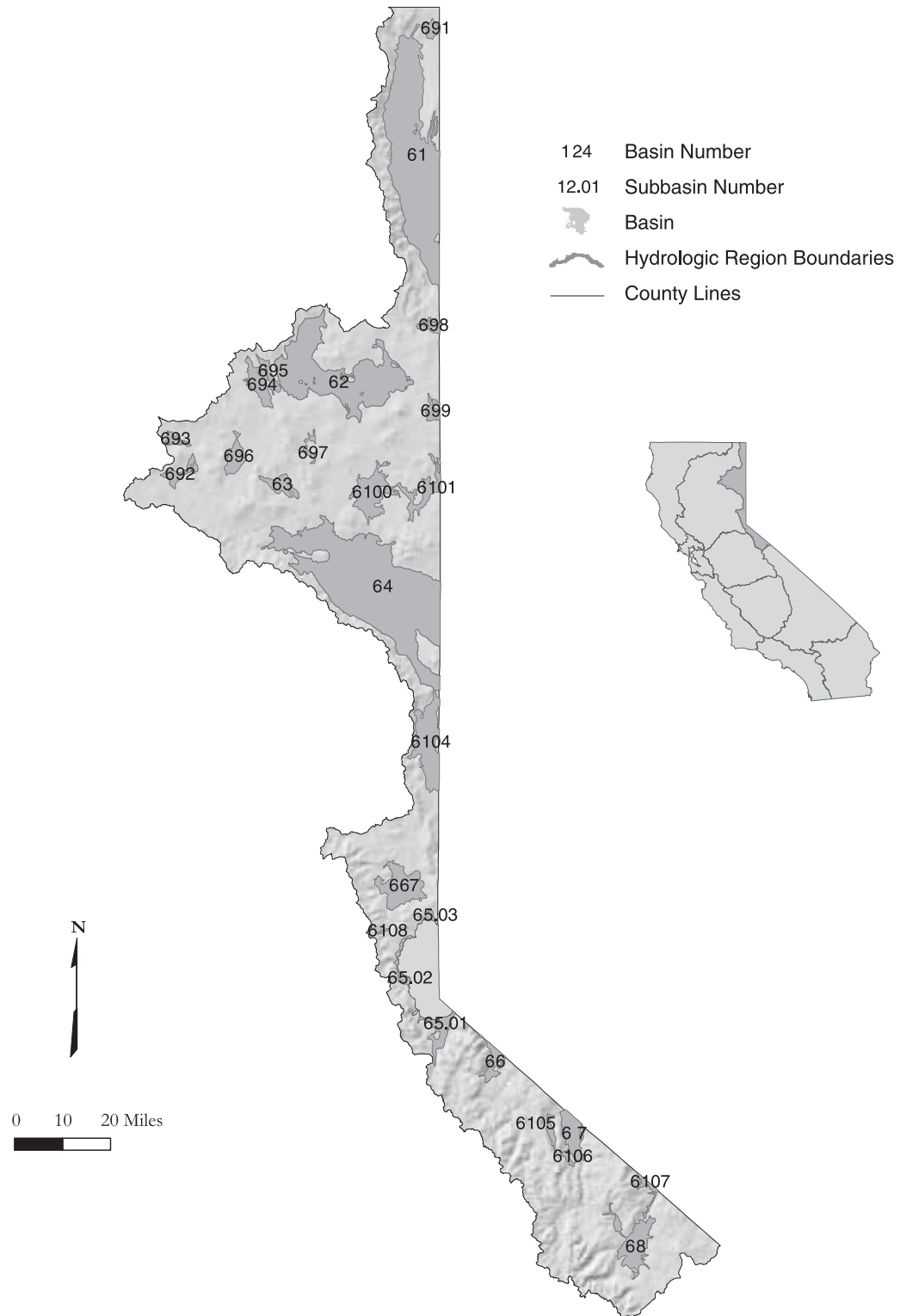


Figure 39 North Lahontan Hydrologic Region

## Basins and Subbasins of the North Lahontan Hydrologic Region

Basin/subbasin	Basin name
6-1	Surprise Valley
6-2	Madeline Plains
6-3	Willow Creek Valley
6-4	Honey Lake Valley
6-5	Tahoe Valley
6-5.01	Tahoe Valley South
6-5.02	Tahoe Valley West
6-5.03	Tahoe Valley North
6-6	Carson Valley
6-7	Antelope Valley
6-8	Bridgeport Valley
6-67	Martis (Truckee) Valley
6-91	Cow Head Lake Valley
6-92	Pine Creek Valley
6-93	Harvey Valley
6-94	Grasshopper Valley
6-95	Dry Valley
6-96	Eagle Lake Area
6-97	Horse Lake Valley
6-98	Tuledad Canyon
6-99	Painters Flat
6-100	Secret Valley
6-101	Bull Flat
6-104	Long Valley
6-105	Slinkard Valley
6-106	Little Antelope Valley
6-107	Sweetwater Flat
6-108	Olympic Valley

## Description of the Region

The North Lahontan HR covers approximately 3.91 million acres (6,110 square miles) and includes portions of Modoc, Lassen, Sierra, Nevada, Placer, El Dorado, Alpine, Mono, and Tuolumne counties (Figure 39). Reaching south from the Oregon border almost to Mono Lake on the east side of the Sierra, this region encompasses portions of two geomorphic provinces. From Long Valley north, most of the groundwater basins of the region were formed by basin and range block faulting near the western extent of the province. South from Long Valley, most of the basins are in the alpine valleys of the Sierra Nevada or are at the foot of the Sierra along the California-Nevada border where streams and rivers draining the eastern Sierran slopes terminate in desert sinks or lakes. The region corresponds to approximately the northern half of RWQCB 6. Significant geographic features include the Sierra Nevada, the volcanic terrane of the Modoc Plateau, Honey Lake Valley, and Lake Tahoe. The latter two areas are the major population centers in the region. The 1995 population of the entire region was about 84,000 people (DWR, 1998).

The northern portion of the region is rural and sparsely populated. Cattle ranching and associated hay cropping are the predominant land uses in addition to some pasture irrigation. Less than 4 percent of the entire region is irrigated. About 75 percent of the irrigated lands are in Modoc and Lassen counties, and most of the remainder is in Alpine and Mono counties. Much of the southern portion of the region is federally owned and managed as national forest lands where tourism and recreation constitute much of the economic base.

Much of the North Lahontan HR is chronically short of water due to the arid, high desert climate, which predominates in the region. Throughout the northern portion of the region where annual precipitation can be as low as 4 inches, runoff is typically scant and streamflows decrease rapidly during the irrigation season as the snowpack in the higher elevations melts. In the southern portion of the region, annual precipitation ranges from more than 70 inches (mostly snow in the higher elevations of the mountains) to as little as 8 inches in the low elevation valleys. In wet years, surface water can meet much of the agricultural demand, but in dry years, most of the region relies heavily on groundwater to meet water supply needs.

## Groundwater Development

There are 24 groundwater basins in the region, one of which is divided into three subbasins. Thirteen of these basins are shared with Nevada and one with Oregon. These basins underlie approximately 1.03 million acres (1,610 square miles) or about 26 percent of the entire region. Although the groundwater basins were delineated based on mapped alluvial fill, much of the groundwater produced in many of them actually comes from underlying fractured rock aquifers. This is particularly true in the volcanic areas of Modoc and Lassen counties where, in many basins, volcanic flows are interstratified with lake sediments and alluvium. Wells constructed in the volcanics commonly produce large amounts of groundwater, whereas wells constructed in fine-grained lake deposits produce less. Because the thickness and lateral extent of the hard rocks outside of the defined basin are generally not known, actual groundwater in storage in these areas is unknown.

Locally, groundwater is an important resource accounting for about 28 percent of the annual supply for agricultural and urban uses. Groundwater use in the region represents less than 1 percent of the State's overall supply for agricultural and urban uses (DWR 1998).

In the northern portion of the region, a sizable quantity of groundwater (nearly 130,000 acre-feet) is extracted annually for agricultural and municipal purposes. Groundwater extracted from the Honey Lake Valley Basin accounts for 41,900 acre-feet of the agricultural supply and 12,000 acre-feet of the municipal supply (based on normalized data from 1990). An additional 3,100 acre-feet is extracted to meet the demands of the Honey Lake Wildlife Area, which provides habitat for several threatened species (Bald Eagle, Sandhill Crane, Bank Swallow, and Peregrine Falcon).

Well yields in the Honey Lake Valley Basin are greatest in alluvial and volcanic deposits. Wells drawing from these deposits may have yields that vary from 10 gpm to more than 2,000 gpm, but drawdown in these cases is generally high. Eight wells in the Honey Lake Wildlife Area have an average yield of between 1,260 and 2,100 gpm. Depths of completed wells in the region range from 20 to 720 feet.

The Honey Lake Valley Basin is very close to exceeding prudent perennial yield, and future development could come at the expense of water for agriculture. A 1987 agreement between DWR, the state of Nevada, and the U.S. Geological Survey resulted in a study of the groundwater flow system in eastern Honey Lake Valley. Upon conclusion of the study in September 1990, a Nevada state engineer ruled that only about 13,000 acre-feet could be safely transferred from the basin.

No major changes in water use are anticipated in the near future in the northern portion of the region. Irrigated agriculture is already constrained by economically available water supplies. A small amount of agricultural expansion is expected but only in areas that can support minor additional groundwater development. Likewise, the modest need for additional municipal and irrigation supplies can be met by minor expansion of present surface systems or by increased use of groundwater.

The principal drainages in the southern portion of the region are the Truckee, Walker and Carson rivers. Water rights in these drainages historically have been heavily contested, and allocations are limited by interstate agreements with Nevada, in-stream environmental requirements, and miscellaneous private rights holders. In the Lake Tahoe Basin, further development is strictly limited because of concerns regarding water quality in the lake. Surface water storage developed in the region's drainages provides urban and agricultural supply to the Reno/Sparks area and to the many smaller communities in the eastern Sierra and at the foot of the mountain slopes. Most communities rely on a combination of surface water and groundwater supply.

In the upper Truckee drainage, the primary groundwater basins underlie the areas around Lake Tahoe and Martis Valley, where the Town of Truckee is located. Both areas use surface water and groundwater for urban and surrounding rural domestic supplies.

Little is known about the small groundwater basins developed along the foot of the eastern Sierra. Most communities overlying these basins are along the streams and rivers flowing down the mountains, and groundwater is extracted from the underlying alluvium. Groundwater augments surface supplies for agricultural purposes and supports municipal and rural domestic supplies.

### Groundwater Quality

In basins in the northern portion of the region, groundwater quality ranges widely from excellent to poor. Wells that obtain their water supply from lake deposits can have high concentrations of boron, arsenic, fluoride, nitrate, and TDS. TDS content generally increases toward the central portions of these basins where concentrations have accumulated over time. The groundwater quality along the margins of most of these basins tends to be of much better quality. There is a potential for future groundwater pollution occurring in urban/suburban areas where single-family septic systems have been installed, especially in hard rock areas. Groundwater quality in the alpine basins is good to excellent; but, as in any area where single-family septic systems have been installed, there is potential for degradation of groundwater quality.

#### *Water Quality in Public Supply Wells*

From 1994 through 2000, 169 public supply water wells were sampled in 8 of the 26 basins and subbasins in the North Lahontan HR. Evaluation of the analyzed samples indicates that 147 wells, or 87 percent, met the state primary MCLs for drinking water. Twenty-two wells, or 13 percent, have constituents that exceed one or more MCL. Figure 40 shows the percentages of each contaminant group that exceeded MCLs in the 22 wells.

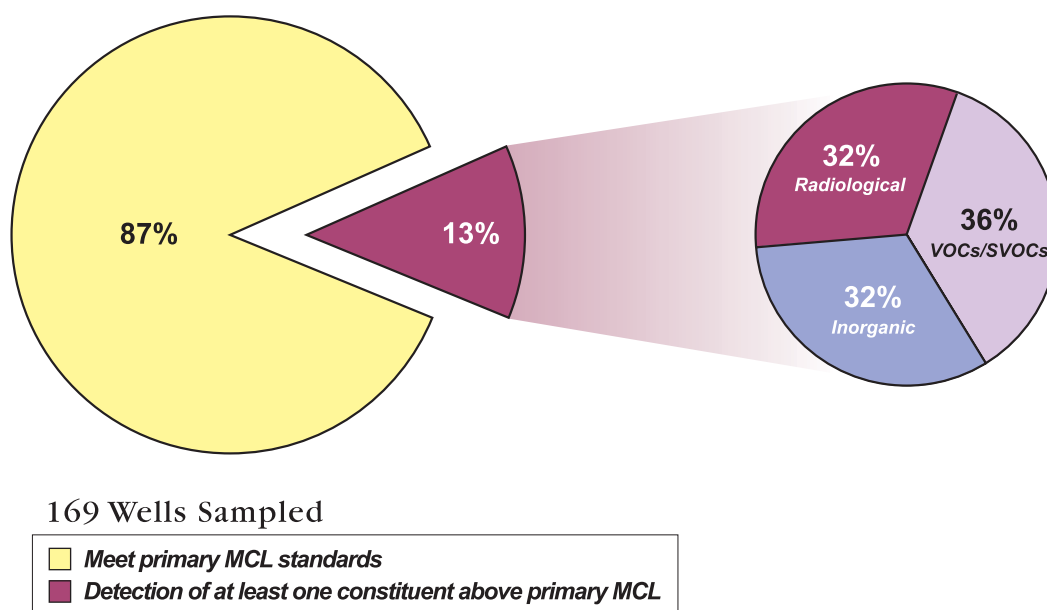


Figure 40 MCL exceedances in public supply wells in the North Lahontan Hydrologic Region

Table 34 lists the three most frequently occurring contaminants in each contaminant group and shows the number of wells in the HR that exceeded the MCL for those contaminants.

**Table 34 Most frequently occurring contaminants by contaminant group  
in the North Lahontan Hydrologic Region**

Contaminant group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics – Primary	Fluoride – 3	Thallium – 3	3 tied at 1 exceedance
Inorganics – Secondary	Iron – 14	Manganese – 13	TDS – 1
Radiological	Gross Alpha – 7	Uranium – 5	Radium 226 – 1
VOCs/SVOCs	1,2 Dichloroethane – 8	TCE – 2	MTBE – 1

TCE = Trichloroethylene

MTBE = Methyltertiarybutylether

VOC = Volatile Organic Compound

SVOC = Semivolatile Organic Compound

### Changes from Bulletin 118-80

There are no newly defined basins since Bulletin 118-80. The only delineated areas removed from the list of region basins are the Recent and Pleistocene volcanic areas of the Modoc Plateau, previously numbered 6-102 and 6-103, respectively.

Table 35 North Lahontan Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
6-1	SURPRISE VALLEY	228,000	B	2,500	1,383	16	11	4	224	87 - 1,800
6-2	MADELINE PLAINS	156,150	B	-	450	2	6	-	402	81 - 1,790
6-3	WILLOW CREEK VALLEY	11,700	B	-	-	7	4	-	401	90 - 1,200
6-4	HONEY LAKE VALLEY	311,150	B	2,500	784	39	24	49	518	89 - 2,500
6-5	TAHOE VALLEY									
6-5.01	TAHOE SOUTH	14,800	C	4,000	-	6	-	54	-	59 - 206
6-5.02	TAHOE WEST	6,000	C	-	-	-	9	3	103	68 - 128
6-5.03	TAHOE VALLEY NORTH	2,000	C	900	-	-	-	-	141	-
6-6	CARSON VALLEY	10,700	C	-	-	-	-	-	-	-
6-7	ANTELOPE VALLEY	20,100	A	-	-	-	-	12	-	-
6-8	BRIDGEPORT VALLEY	32,500	C	-	-	-	-	6	-	-
6-67	MARTIS VALLEY	35,600	C	-	-	-	-	-	-	-
6-91	COW HEAD LAKE VALLEY	5,600	B	-	-	-	-	-	-	-
6-92	PINE CREEK VALLEY	9,530	B	-	-	-	-	1	-	-
6-93	HARVEY VALLEY	4,500	B	-	-	-	-	-	-	-
6-94	GRASSHOPPER VALLEY	17,670	B	-	-	-	-	-	-	-
6-95	DRY VALLEY	6,500	B	-	-	-	-	-	-	-
6-96	EAGLE LAKE AREA	-	B	-	-	-	4	4	-	-
6-97	HORSE LAKE VALLEY	3,800	B	-	-	-	-	-	-	-
6-98	TULEDAD CANYON	5,200	B	-	-	-	-	-	-	-
6-99	PAINTERS FLAT	6,400	B	-	-	-	-	-	-	-
6-100	SECRET VALLEY	33,680	B	-	-	2	2	-	-	125 - 3,200
6-101	BULL FLAT	18,100	B	-	-	-	-	-	-	-
6-104	LONG VALLEY	46,840	B	-	-	31	4	-	302	127 - 570
6-105	SLINKARD VALLEY	4,500	C	-	-	-	-	-	-	-
6-106	LITTLE ANTELOPE VALLEY	2,500	C	-	-	-	-	-	-	-
6-107	SWEETWATER FLAT	4,700	C	-	-	-	-	-	-	-
6-108	OLYMPIC VALLEY	700	C	600	330	-	-	2	-	-

gpm - gallons per minute

mg/L - milligram per liter

TDS -total dissolved solids